PATENT CLAIMS:

1-31 (Canceled)

32. (Currently Amended) A method for making reinforced tube-shaped structures comprising the steps of:

a) applying a first rubber layer with a first extrusion unit to a series of sequential rigid cylindrical mandrels which are coupled to each other and which are driven at an advancement speed (v) in the direction of an advancement axis (X);

b) applying a first filament layer at defined desired filament angles (α_1) referred to the advancement axis (X) by rotating a bobbin creel unit about the advancing mandrels;

c) applying at least one further rubber layer to the first filament layer utilizing at least one additional extrusion unit;

d) continuously measuring the advancement speed (v) of the mandrels;

e) controlling the rubber quantity, which is applied via the first extrusion unit, in dependence upon the measured advancement speed (v) in order to obtain a defined desired thickness of the first rubber layer; and,

f) controlling the rotational speed of the first bobbin creel unit during the rotation about the mandrels in dependence upon the advancement speed (v) in order to obtain a filament layer having the defined desired filament angles (α_1);

applying at least one further filament layer to each of the further rubber layers at defined desired filament angles (α_2) referred to the advancement axis (X) in each case with a second bobbin creel unit by rotating the second bobbin creel about the forwardly driven mandrels;

controlling the rotational speed of the additional bobbin creel unit during the rotation about the mandrels in dependence upon the rotational speed of the first bobbin creel unit, the bobbin creel units being coupled to each other via a dead time and coupling factors.

33. (Previously Presented) The method of claim 32, comprising the further step of continuously measuring the thickness (d_a) of the first rubber layer and controlling the rubber quantity, which is applied via the first extrusion unit, in dependence upon the

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measured thickness (d_a).

34. (Previously Presented) The method of claim 33, comprising the further step of controlling the rotational speed of the bobbin creel unit in step (f) in dependence upon the measured thickness (d_a) of the first rubber layer.

35. (Previously Presented) The method of claim 34, comprising the further step of controlling the rubber quantities, which are applied via the further extrusion unit in dependence upon the advancement speed (v) in order to obtain a defined desired thickness of the additional rubber layers.

36. (Previously Presented) The method of claim 35, comprising the further step of controlling the mandrel advancement speed in accordance with the measured advancement speed (v).

37. (Currently Amended) A method for making reinforced tube-shaped structures comprising the steps of:

applying a first rubber layer with a first extrusion unit to a series of sequential rigid cylindrical mandrels which are coupled to each other and which are driven at an advancement speed (v) in the direction of an advancement axis (X);

applying a first filament layer at defined desired filament angles (α_1) referred to the advancement axis (X) by rotating a bobbin creel unit about the advancing mandrels;

applying at least one further rubber layer to the first filament layer utilizing at least one additional extrusion unit;

continuously measuring the advancement speed (v) of the mandrels;

controlling the rotational speed of the first bobbin creel unit during the rotation about the mandrels in dependence upon the advancement speed (v) in order to obtain a filament layer having the defined desired filament angles (α_1);

~~The method of claim 32, comprising the further steps of:~~

applying at least one further filament layer to each of the ~~first~~ further rubber layers at defined desired filament angles (α_2) referred to the advancement axis (X) in each case

with a second bobbin creel unit by rotating the second bobbin creel about the forwardly driven mandrels;

applying at least one additional rubber layer to each filament layer utilizing a corresponding extrusion unit;

controlling the rotational speed of the additional bobbin creel unit during the rotation about the mandrels in dependence upon ~~at least one of the advancement speed (v) and~~ the rotational speed of the first bobbin creel unit; and,

controlling the rotational speeds of the additional bobbin creel unit in dependence upon a desired thickness of the additional rubber layer and the desired filament angles (α_2) with the bobbin creel units being coupled to each other via a dead time and coupling factors.

38. (Previously Presented) The method of claim 37, comprising the further step of variably adjusting the filament angles (d) by controlling the rotational speeds of the bobbin creel units with the bobbin creel units being coupled to each other via a dead time and coupling factors so that a change of the filament angle of a filament layer is coupled by a bobbin creel unit to a position of the reinforced tube-shaped structure to a corresponding change of the filament angle of additional filament layer at the same position via the additional bobbin creel unit.

39. (Previously Presented) The method of claim 32, comprising the further step of controlling the rubber quantities, which are applied via the extrusion units, in dependence upon the measured mean wall thickness.

40. (Previously Presented) The method of claim 32, comprising the further step of controlling the rubber quantity, which is applied by an extrusion unit, in dependence upon the particular pressure in the injection head of the corresponding extrusion unit.

41. (Previously Presented) The method of claim 32, comprising the further step of controlling the thicknesses (d) of the applied rubber layers via rotational speed control of a gear pump, which is mounted, in each case, between the extruder and the extrusion head

of an extrusion unit.

42. (Previously Presented) The method of claim 32, comprising the further step of measuring the thickness (d) of the applied layers at several positions on the periphery of the reinforced tube-shaped structure for control, fault detection and/or fault characterization when there is a deviation from a desired value with the deviation going beyond a defined tolerance limit.

43. (Previously Presented) The method of claim 42, comprising the step of determining the layer thickness from the mean value of the thicknesses (d) of the applied layers with the thicknesses (d) being measured at the periphery.

44. (Previously Presented) The method of claim 43, comprising the step of rotating a unit to measure the thicknesses (d) of the applied layers over the time about the periphery of the reinforced tube-shaped structure and recording the thickness (d) at several peripheral positions.

45. (Currently Amended) ~~The method of claim 44, comprising the further step of~~ A method for making reinforced tube-shaped structures comprising the steps of:

a) applying a first rubber layer with a first extrusion unit to a series of sequential rigid cylindrical mandrels which are coupled to each other and which are driven at an advancement speed (v) in the direction of an advancement axis (X);

b) applying a first filament layer at defined desired filament angles (α_1) referred to the advancement axis (X) by rotating a bobbin creel unit about the advancing mandrels;

c) applying at least one further rubber layer to the first filament layer utilizing at least one additional extrusion unit;

d) continuously measuring the advancement speed (v) of the mandrels;

e) controlling the rubber quantity, which is applied via the first extrusion unit, in dependence upon the measured advancement speed (v) in order to obtain a defined desired thickness of the first rubber layer; and,

f) controlling the rotational speed of the first bobbin creel unit during the rotation

about the mandrels in dependence upon the advancement speed (v) in order to obtain a filament layer having the defined desired filament angles (α_1); and

g) contactlessly measuring the outer edges of the reinforced tube-shaped structure and the outer edges of the mandrel and determining the thickness of the reinforced tube-shaped structure from the positions of the outer edges.

46. (Previously Presented) The method of claim 45, comprising the further step of optically measuring the outer edges of the reinforced tube-shaped structure and inductively measuring the outer edges of the mandrel.

47. (Previously Presented) The method of claim 46, comprising the further step of applying a separating agent to the mandrels with a separating agent application unit in advance of applying the first rubber layer and controlling the applied separating agent quantity in dependence upon the advancement speed (v) of the mandrels.

48. (Previously Presented) The method of claim 47, comprising the further step of applying separating agents to the outermost rubber layer and controlling the applied quantity of separating agent in dependence upon the advancement speed (v) of the mandrels.

49. (Previously Presented) The method of claim 48, comprising the further step of measuring process variables during the application of the rubber layers and the reinforcement layers; marking defective regions of the reinforced tube-shaped structure when the process variables exceed or drop below a corresponding fault tolerance amount; optically detecting the marked defective regions; and, separating out the sections of the reinforced tube-shaped structure which are recognized as defective.

50. (Previously Presented) The method of claim 49, comprising the further step of marking sections of the reinforced tube-shaped structure after the application of the topmost rubber layer with a product marking, especially with the production time and/or a charge number wherein the marking identifies a separation location and the assembly

facility and direction of assembly of the structure.

51. (Currently Amended) An arrangement for making reinforced tube-shaped structures comprising:

a) a first extrusion unit for applying a first rubber layer to a series of sequential rigid cylinder-shaped mandrels, which are coupled to each other, the mandrels being driven at an advancement speed (v) in a direction of an advancement axis (X);

b) a first bobbin creel unit, which rotates about the advancing mandrels, for applying a first filament layer at defined desired filament angles (α_1) referred to the advancement axis (X);

c) at least one additional extrusion unit for applying at least one additional rubber layer to the first filament layer;

d) advancement speed measuring means for continuously measuring the advancing speed (v) of the mandrels;

e) at least one control unit for driving the extrusion units and the bobbin creel units with the control unit being configured for:

controlling the rotational speed of the first bobbin creel unit during the rotation about the mandrels in dependence upon the advancement speed (v) in order to obtain a filament layer having defined desired filament angles (α_1); and,

controlling the rubber quantity, which is applied by the first extrusion unit, in dependence upon the measured advancement speed (v) in order to obtain a defined desired thickness of the first rubber layer;

f) a layer thickness measuring means with measuring units for measuring the outer edges of the reinforced tube-shaped structure at several positions on the periphery of the tube-shaped structure and at least one contactless measuring sensor for detecting the outer edges of the mandrel.

52. (Previously Presented) The arrangement of claim 51, further comprising layer thickness measuring means for continuously measuring the thickness (d_a) of the first rubber layer and controlling the rubber quantity, which is applied by the first extrusion unit,

in dependence upon the measured mean thickness (d_a).

53. (Previously Presented) The arrangement of claim 52, further comprising an additional layer thickness measuring means behind the additional extrusion units to continuously measure the thickness (d) of the particular rubber layer and controlling the rubber quantity in dependence upon the correspondingly measured mean thickness (d), the rubber quantity being applied via the corresponding extrusion unit.

54. (Previously Presented) The arrangement of claim 53, wherein the control unit is also configured for controlling the rubber quantities in dependence upon the advancement speed (v) in order to obtain a defined desired thickness of the additional rubber layers with the rubber quantities being applied via the additional extrusion unit.

55. (Previously Presented) The arrangement of claim 54, wherein the control unit is configured for controlling the mandrel advancement speed in accordance with the measured advancement speed (v).

56. (Previously Presented) The arrangement of claim 55, further comprising:

at least one additional bobbin creel unit for applying an additional filament layer to the particular rubber layer at a defined desired filament angle (α_2) referred to the advancement axis (X); and,

at least one additional extrusion unit for applying additional rubber layers to respective filament layers.

57. (Previously Presented) The arrangement of claim 56, further comprising at least one additional control unit which is configured to:

control the rotational speed of the additional bobbin creel units in dependence upon a desired thickness of the respective rubber layers and the respective desired filament angles (α_2);

control the additional bobbin creel units during rotation about the mandrels in dependence upon the advancement speed (v); and,

control the additional rubber quantity, which is applied by the additional extrusion units, in dependence upon the measured advancement speed (v) of the mandrels.

58. (Previously Presented) The arrangement of claim 57, further comprising a gear pump between each extruder and the extrusion head of each extrusion unit for controlling the thickness of the applied rubber layers with the control taking place via a rotation speed change of the gear pump.

59. (Canceled)

60. (Previously Presented) The arrangement of claim [[59]] 51, wherein the layer thickness measuring means for recording the outer edges at several positions on the periphery of the reinforced tube-shaped structure are rotatable about the reinforced tube-shaped structure.

61. (Previously Presented) The arrangement of claim 60, further comprising computing means, which are connected to the layer thickness measuring means and are configured for determining the thickness of the reinforced tube-shaped structure from the mean value of the specific thicknesses at several peripheral positions of the reinforced tube-shaped structure.

62. (Previously Presented) The arrangement of claim 61, wherein at least one measuring sensor for the outer edges of the mandrel is an inductive sensor.